Claims:

1. A translinear circuit implementing a piecewise-polynomial-continuous function containing a removable singularity in at least one segment thereof, comprising:

a plurality of input transistors for receiving a respective plurality of input currents; and

a circuit for providing a plurality of perturbation currents when said translinear circuit operates within said at least one segment containing a removable singularity;

wherein said translinear circuit is configured to add said perturbation currents to those of said input currents received by said input transistors that are responsible for creating said removable singularity.

2. The circuit of claim 1 wherein said input currents are substantially proportional.

3. The circuit of claim 1 wherein said perturbation currents are substantially equal.

4. The circuit of claim 1 wherein said input transistors are bipolar transistors.

5. The circuit of claim 1 wherein said circuit for providing said perturbation currents comprises a Trafton-Hastings clamp transistor connected to provide a collector current that indicates when said input currents that are responsible for creating said removable singularity are substantially equal.

6. The circuit of claim 5 wherein said Trafton-Hastings clamp transistor is connected to produce a collector current that substantially differs from zero when said input currents that are responsible for creating said removable singularities are substantially equal.

7. The circuit of claim 6 wherein said perturbation currents are substantially proportional to said collector current of said Trafton-Hastings clamp transistor.

8. The circuit of claim 5 wherein said circuit for providing said perturbation currents further comprises a current mirror controlled by said Trafton-Hastings clamp transistor to supply said perturbation currents to said input transistors.

9. The circuit of claim 5 wherein said Trafton-Hastings clamp transistor is connected to produce a collector current that substantially equals zero when said input currents that are responsible for creating said removable singularities are substantially proportional.

10. The circuit of claim 5 further comprising a current source and a control transistor, connected in series, wherein a base of said Trafton-Hastings clamp transistor is connected to a node between said current source and said control transistor, and wherein said plurality of perturbation currents are substantially proportional

to a difference between a current delivered by the current source and a current consumed by said control transistor.

11. A method for operating a translinear circuit implementing a piecewise-polynomial-continuous function containing a removable singularity in at least one segment thereof, comprising:

applying a plurality of input currents to a respective plurality of input transistors;

generating a plurality of perturbation currents when said translinear circuit operates within said at least one segment containing a removable singularity;

and allowing said translinear circuit to add said perturbation currents to those of said input currents received by said input transistors that are responsible for creating said removable singularities.

12. The method of claim 11 wherein said generating a plurality of perturbation currents comprises generating a plurality of substantially equal perturbation currents.

13. The method of claim 11 wherein said providing said perturbation currents comprises connecting a Trafton-Hastings clamp transistor to provide a collector current that indicates when said input currents that are responsible for creating said removable singularities are substantially proportional.

14. The method of claim 13 wherein said connecting a Trafton-Hastings clamp transistor comprises connecting a Trafton-Hastings clamp transistor to produce a collector current that substantially differs from zero when said input currents that are responsible for creating said removable singularities are substantially proportional.

15. The method of claim 14 wherein said providing said perturbation currents comprises providing perturbation currents that are substantially proportional to said collector current of said Trafton-Hastings clamp transistor.

16. The method of claim 13 wherein said providing said perturbation currents further comprises providing a current mirror controlled by said Trafton-Hastings clamp transistor to supply said perturbation currents to said input transistors.

17. The method of claim 13 wherein said connecting a Trafton-Hastings clamp transistor comprises connecting a Trafton-Hastings clamp transistor to produce a collector current that substantially equals zero when said input currents that are responsible for creating said removable singularities are substantially proportional.

18. The method of claim 13 further comprising providing a current source in series with a control transistor, connecting a base of said Trafton-Hastings clamp transistor to a node between said current source and said control transistor, wherein said plurality of perturbation currents are substantially proportional to a difference between a current delivered by the current source and a current consumed by said control transistor.

19. A method for perturbing a removable singularity in a piecewise-polynomial-continuous transfer function of a translinear circuit incorporating a Trafton-Hastings clamp, comprising:

detecting a region of operation wherein a removable singularity exists within a transfer function of said translinear circuit;

determining a plurality of input currents to the translinear circuit whose magnitude substantially equals zero at the removable singularity;

defining a plurality of substantially equal perturbation currents;

and within the region of operation adding a respective one of said plurality of perturbation currents to each of said input currents.

20.The method of claim 19 wherein said detecting a region of operation comprises detecting when a collector current of said Trafton-Hastings clamp transistor substantially differs from zero.

21. The method of claim 20 wherein said defining a plurality of substantially equal perturbation currents comprises defining said perturbation currents to be substantially proportional to said collector current of said Trafton-Hastings clamp transistor.

22. The method of claim 19 wherein said detecting a region of operation comprises detecting when a collector current of said Trafton-Hastings clamp transistor substantially equals zero.

23. The method of claim 19 further comprising connecting a base of said Trafton-Hastings clamp transistor to a node between a current source and a control transistor, wherein the plurality of perturbation currents are substantially proportional to a difference between a current delivered by said current source and a current consumed by said control transistor.

24. A translinear circuit, comprising:

a pair of translinear loops, including a respective plurality of bipolar input transistors each receiving a respective input current;

a current mirror having a plurality of outputs each connecting to a respective one of said bipolar input transistors; and

a Trafton-Hastings clamp transistor having a collector current coupled to control said outputs of said current mirror, said Trafton-Hastings clamp transistor being coupled to said translinear loops and operating to produce said collector current when said input currents cause said translinear circuit to operate in a segment of a piecewise-polynomial- continuous characteristic function having a removable singularity;

wherein said outputs from said current mirror add to said input currents in said bipolar input transistors.

25. A translinear circuit having two translinear loops, comprising:

a plurality of bipolar input transistors;

a current mirror having a plurality of output currents to add to currents in said bipolar input transistors;

a current source;

a control transistor;

a Trafton-Hastings clamp transistor having a base coupled to said current source and to a collector of said control transistor, a difference between a current delivered by said current source and a current consumed by said control transistor being coupled to said current mirror to be mirrored to said output currents.

26. A circuit comprising:

a reference limb, a control limb, and an output limb,

said reference limb comprising:

a first bipolar transistor having an emitter coupled to a voltage rail, and

a second bipolar transistor having an emitter coupled to a base of said first bipolar transistor;

said control limb comprising:

a third bipolar transistor having an emitter coupled to a voltage rail, and

a fourth bipolar transistor having an emitter coupled to a base of said third bipolar transistor;

said output limb comprising:

a fifth bipolar transistor having an emitter coupled to a voltage rail, and

a sixth bipolar transistor having an emitter coupled to a base of said fifth bipolar transistor;

said second, fourth, and sixth bipolar transistors having bases coupled to a collector of said first bipolar transistor;

a first constant current source coupled to said collector of said first bipolar transistor;

a second constant current source coupled to said emitter of said second bipolar transistor;

a third constant current source coupled to a collector of said third bipolar transistor,

a first input coupled to said emitter of said fourth bipolar transistor;

a second input coupled to said emitter of said sixth bipolar transistor;

a current mirror having outputs coupled to said emitters of said fourth and sixth bipolar transistors;

a Trafton-Hastings clamp bipolar transistor, having a base coupled to said collector of said third bipolar transistor, an emitter coupled to said collector of said first bipolar transistor, and a collector coupled to an input of said current mirror; and

and a circuit output coupled to a collector of said fifth bipolar transistor.

27. The circuit of claim 26, wherein a first current is passed through said first input and a second current is passed through said second input, and wherein said first and second currents are substantially equal.